

Meta Analysis of the Influence of COVID-19 Patient Services on the Level of Anxiety and Depression in Nurses in Hospital

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ABSTRACT

Background: The COVID-19 pandemic has spread around the world and is impacting the mental health of everyone, including healthcare workers. Health workers are at the forefront of treating patients infected with COVID-19. are at high risk of experiencing mental health problems during the COVID-19 pandemic. The purpose of this study was to estimate the magnitude of the effect of COVID-19 patient care on the level of anxiety and depression in nurses in hospitals, with a meta-analysis of primary studies conducted by previous authors.

Subjects and Method: This study is a systematic review and meta-analysis with the following PICO, population: nurses. Intervention: serving COVID-19 patients. Comparison: does not serve COVID-19 patients. Outcome: anxiety and depression. The articles used in this study were obtained from three databases, namely Google Scholar, Pubmed, and Science Direct. Keywords to search for articles “Anxiety” AND “Depression” AND “Nurses” OR “Healthcare worker” AND “COVID-19”. The included article is a full-text English language with a cross-sectional study design from 2020 to 2021 and reports the adjusted Odds Ratio (aOR) in a multivariate analysis. The selection of articles is done by using PRISMA flow diagram. Articles were analyzed using the Review Manager 5.3 application.

Results: A total of 12 cross-sectional studies from America, Asia, and Europe were selected for systematic review and meta-analysis. The data collected showed nurses who served COVID-19 patients had a risk of experiencing anxiety as much as 1.75 times compared to nurses who did not serve COVID-19 patients and this result was statistically significant (aOR= 1.75; 95% CI= 1.29 to 2.37; p<0.001). A meta-analysis of 12 studies from America, Asia and Europe showed that nurses caring for COVID-19 patients had a 1.1 times risk of developing depression compared to nurses who did not serve COVID-19 patients, but this result was not statistically significant (aOR= 1.10; 95% CI= 0.53 to 2.30; p= 0.80).

Conclusion: The effect of caring for COVID-19 patients increases the risk of anxiety and depression in nurses in hospitals.

Keywords: Anxiety, Depression, Nurses, COVID-19

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BACKGROUND

Coronavirus disease 2019 (COVID-19) was first discovered in the city of Wuhan, China in December 2019. This disease spread rapidly throughout the world until finally

the World Health Organization (WHO) declared COVID-19 a pandemic since March 11, 2020. According to the World Health Organization (WHO) on October 17, 2021, the number of confirmed cases in the world

was 239,437,517, data on patients who died were 4,879,235 people infected with COVID-19 cases. While cases in Indonesia were 4,234,758 confirmed, and 142,952 people died. (WHO, 2021). Data in Indonesia for health workers who died as many as 2032, including 730 doctors, 670 nurses, and 630 other health workers.

WHO immediately issued guidelines for the management of severe acute respiratory infections (SARI) suspected to be due to COVID-19. The guidelines contain: 1) a triage process to identify and sort patients with SARI; 2) immediate action for proper infection prevention and control; 3) administration of therapy and monitoring; 4) collection of specimens for laboratory diagnosis; 5) management of hypoxaemic respiratory failure and acute respiratory distress syndrome (ARDS); 6) management of septic shock; 7) prevention of complications; 8) special anti-COVID-19 treatment; and special considerations for pregnant patients (WHO, 2020).

Health professionals will experience more severe mental conditions, because they are at the forefront of COVID-19 services, will face unusual situations, separation from family, increased exposure to COVID-19, fear of infection, and feelings of failure in dealing with prognosis. poor and inadequate technical infrastructure to assist patients. For healthcare workers, it can be difficult to stay mentally healthy in the current situation, difficult to reduce the risk of depression, anxiety, and burnout. In addition, they specifically face problems relating to social interactions when dealing with the ethical challenges of the COVID-19 pandemic, such as working in conditions with insufficient/sufficient resources, unorganized triage situations, inadequate palliative care and inability to support terminally ill patient's family (Vienkers, 2020).

The incidence of COVID-19 cases continues to increase, so that frontline health workers are increasingly under pressure due to the increasing workload, worrying about their health and that of their families (Cheng et al, 2020). The psychological response experienced by health workers to pandemics of infectious diseases is increasing, caused by feelings of anxiety about their own health and the risk of spreading to their families. Anxiety is a worry that is not clearly felt by someone with feelings of uncertainty and helplessness (Stuart, 2016). Panic and fear are part of the emotional aspect, while the mental or cognitive aspects are the emergence of disturbances in attention, worry, irregularity in thinking, and feeling confused (Ghufron and Risnawita, 2014). So that from the COVID-19 incident, health workers feel depressed, worried and also depressed. Depression is an emotional condition that is usually characterized by extreme sadness, feelings of meaninglessness and guilt (withdrawal, unable to sleep, loss of appetite, interest in daily activities (Davidson, 2004).

Many studies have proven that there is an influence of COVID-19 patient care causing psychological disturbances from health workers. This is what underlies the researcher to identify and analyze research based on the meta-analysis design. Meta-analysis is an epidemiological study that statistically combines the results of a number of primary studies that can be combined to obtain a quantitative overview (Murti, 2021). According to Detels et al. (2015), meta-analysis is a systematic study that uses statistical methods to combine data from similar studies to obtain estimates that are more precise than those from primary research. Based on this background, comprehensive research is needed from various primary studies on the effect of COVID-19 services on anxiety and

depression in nurses in hospitals.

SUBJECTS AND METHOD

1. Study Design

This was a systematic review and meta analysis. The articles used in this study were obtained from several databases, namely Google Scholar, Pubmed, and Science Direct between 2020 and 2021. The selection of articles was carried out using PRISMA flow diagrams. Keywords to search for articles are as follows “Anxiety” AND “Depression” AND “Nurses” AND “COVID-19”.

2. Inclusion Criteria

The inclusion criteria in this research article are: full-text articles using a cross-sectional study design, research subjects are nurses, research outcomes are anxiety and depression, multivariate analysis with adjusted Odds Ratio (aOR) to measure the estimated effect.

3. Exclusion Criteria

The exclusion criteria in this research article were: articles published in languages other than English, statistical results reported in the form of bivariate analysis, articles before 2020.

4. Operational Definition of Variable

The search for articles was carried out by considering the eligibility criteria determined using the PICO model. Population: nurses. Intervention: serving COVID-19 patients. Comparison: does not serve COVID-19 patients. Outcome: anxiety and depression.

COVID-19 patient care is defined as the provision of services to patients with COVID-19. The instrument used is a certificate. The measurement scale is categorical.

Anxiety and depression

Anxiety is defined as a feeling that arises in an individual's personality due to a situation or condition that threatens / fears / worries

/ anxiety. The instrument used was Generalized Anxiety Disorder-7 (GAD-7). The measurement scale is continuous. Depression is defined as a psychological problem that has a negative impact on thoughts, actions, feelings and health so that you feel hopeless, helpless, full of rejection or feeling worthless. The instrument used was the Patient Health Questionnaire-9 (PHQ-9). The measurement scale is continuous.

5. Instrument Study

Research is guided by the PRISMA flow diagram and quality assessment using the Critical Appraisal Skills Program (CASP, 2018).

6. Data Analysis

The data in the study were analyzed using the Review Manager application (RevMan 5.3). Forest plots and funnel plots were used to determine the size of the relationship and heterogeneity of the data. The fixed effect model is used for homogeneous data, while the random effect model is used for heterogeneous data across studies.

RESULTS

The article search process is carried out through several journal databases including Google Scholar, Pubmed, and Science Direct. The review process for related articles can be seen in the PRISMA flow diagram in Figure 1. Research related to the effect of COVID-19 patient care on anxiety and depression in nurses consists of 12 articles from the initial search process yielding 1,488 articles, after the deletion process of published articles obtained 862 articles with 624 of them met the requirements for further full-text review. A total of 12 articles that met the quality assessment were included in the quantitative synthesis using a meta-analysis.

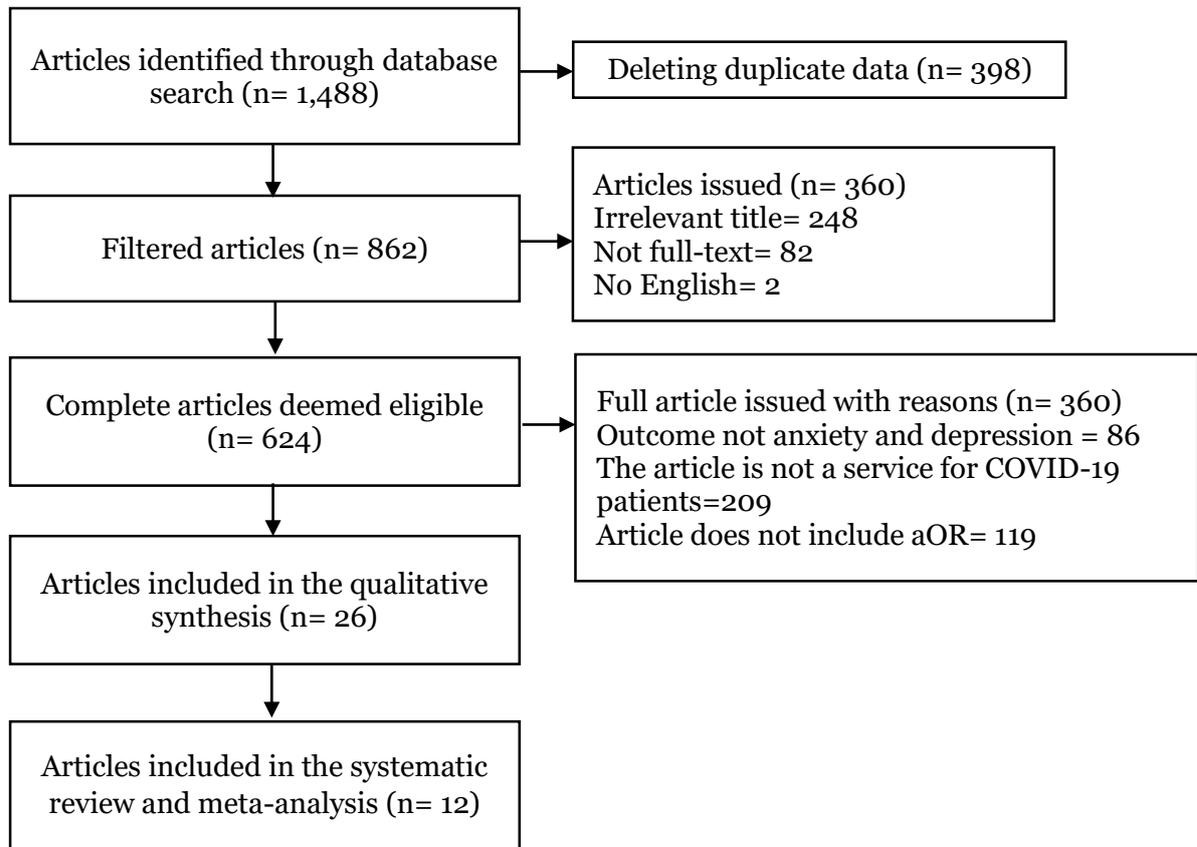


Figure 1. PRISMA flow diagram



Figure 2. Map of the research area the influence of COVID-19 patient care on nurses' anxiety and depression

It can be seen in Figure 2 that the research articles come from three continents, namely America (United States), Europe (Italy), and Asia (China, Turkey, Iran, Saudi Arabia, Jordan, Korea, Qatar and India). Table 1, the researchers conducted an assessment of the quality of the study (critical appraisal for cross-sectional study) the effect of COVID-19 patient care on nurses' anxiety. Table 2, researchers conducted a quality study of the effect of COVID-19 patient care on nurses' depression. Table 3, shows that 12 articles from a cross-sectional study as evidence of the association of COVID-19 patient care on anxiety and depression in hospital nurses.

Based on the results of the forest plot, a cross-sectional study showed that nurses who served COVID-19 patients had a risk of experiencing anxiety as much as 1.75 times compared to nurses who did not serve COVID-19 patients and this result was statistically significant (aOR = 1.75; 95% CI= 1.29 to 2.37; $p < 0.001$) The heterogeneity in this study showed $I^2 = 89\%$, so that the distribution of the data was declared heterogeneous (random fixed effect). Based on the results of the forest plot cross-sectional study, Figure 5 shows that nurses who serve

COVID-19 patients have a 1.1 times risk of experiencing depression compared to nurses who do not serve COVID-19 patients, but this result is not statistically significant (aOR= 1.10; 95% CI= 0.53 to 2.30; $p = 0.80$). The heterogeneity in this study showed $I^2 = 98\%$, so that the distribution of the data was declared heterogeneous (random fixed effect).

The results of the funnel plot in Figure 4, show publication bias with an underestimate effect which is characterized by an asymmetric distribution between the right and left plots. There are 3 plots on the right, 7 plots on the left and 2 plots touching the vertical line. The plot on the right of the graph appears to have a standard error (SE) between 0 to 1, the plot on the left of the graph appears to have a standard error (SE) between 0 and 1.50. The results of the funnel plot in Figure 6, show that there is no publication bias as indicated by a symmetrical distribution between the right and left plots. There are 5 plots on the left and 7 plots on the right. The plot on the left of the graph appears to have a standard error (SE) between 0 and 1 and the plot on the right has a standard error (SE) between 0 and 0.8.

Table 1. Critical appraisal checklist for cross-sectional study of the effect of COVID-19 patient care on nurse anxiety

No	Questions of Checklist	Publication (Author and Year)											
		Ahn et al (2020)	Alah et al (2020)	Alateeq et al (2020)	Buselli et al (2020)	Tu et al (2020)	Lai et al (2020)	Pour et al (2020)	Naser et al (2020)	Rossi et al (2020)	Ahin et al (2020)	Prasad et al (2020)	Hong et al (2020)
1	Do these objectives clearly address the research focus/problem?	1	1	1	1	1	1	1	1	1	1	1	1
2	Are cross-sectional research methods suitable to answer the research question?	1	1	1	1	1	1	1	1	1	1	1	1
3	Is the research subject selection method clearly written?	1	1	1	1	1	1	1	1	1	1	1	1
4	Does the sampling method not introduce bias (selection)?	1	0	1	1	1	1	1	0	1	1	1	1
5	Does the research sample taken represent the designated population?	1	1	1	1	1	1	1	1	1	1	1	1
6	Was the sample size based on pre-study considerations?	1	1	1	1	1	1	1	1	1	1	1	1
7	Was a satisfactory response achieved?	1	1	1	1	1	1	1	1	1	1	1	1
8	Is the GAD-7 anxiety instrument valid and reliable?	1	1	1	1	1	1	1	1	1	1	1	1
9	Was statistical significance assessed?	1	1	1	1	1	1	1	1	1	1	1	1
10	Was a confidence interval given for the main outcome?	1	1	1	1	1	1	1	1	1	1	1	1
11	Have confounding factors been taken into account?	0	1	0	0	1	1	0	1	1	1	0	1
12	Are the results applicable to your research?	1	1	1	1	1	1	1	1	1	1	1	1
Total		11	11	11	11	12	12	11	11	12	12	11	12

Note:

1: Yes; 0: No

Table 2. Critical appraisal checklist for cross-sectional study of the effect of COVID-19 patient care on nurse depression

No	Questions of Checklist	Publication (Author and Year)											
		Ahn et al (2020)	Alah et al (2020)	Alateeq et al (2020)	Buselli et al (2020)	Tu et al (2020)	Lai et al (2020)	Pour et al (2020)	Naser et al (2020)	Rossi et al (2020)	Ahin et al (2020)	Prasad et al (2020)	Hong et al (2020)
1	Do these objectives clearly address the research focus/problem?	1	1	1	1	1	1	1	1	1	1	1	1
2	Are cross-sectional research methods suitable to answer the research question?	1	1	1	1	1	1	1	1	1	1	1	1
3	Is the research subject selection method clearly written?	1	1	1	1	1	1	1	1	1	1	1	1
4	Does the sampling method not introduce bias (selection)?	1	0	1	1	0	1	1	1	1	1	0	1
5	Does the research sample taken represent the designated population?	1	1	1	1	1	1	1	1	1	1	1	1
6	Was the sample size based on pre-study considerations?	1	1	1	1	1	1	1	1	1	1	1	1
7	Was a satisfactory response achieved?	1	1	1	1	1	1	1	1	1	1	1	1
8	Is the PHQ-9 anxiety instrument valid and reliable?	1	1	1	1	1	1	1	1	1	1	1	1
9	Was statistical significance assessed?	1	1	1	1	1	1	1	1	1	1	1	1
10	Was a confidence interval given for the main outcome?	1	1	1	1	1	1	1	1	1	1	1	1
11	Have confounding factors been taken into account?	0	1	1	0	1	1	0	1	1	1	1	1
12	Are the results applicable to your research?	1	1	1	1	1	1	1	1	1	1	1	1
Total		11	11	12	11	11	12	11	12	12	12	11	12

Note:
1: Yes; 0: No

Table 3. Description of the primary studies included in the meta-analysis

Author (year)	Country	Study Design	Sample	P (Population)	I (Intervention)	C (Comparison)	O (Outcome)	aOR (CI 95%)
Ahn <i>et al.</i> (2020)	South Korea	Cross-sectional	967	COVID-19 room nurse	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.20(1.17 to 1.24) 1.37(1.02 to 1.98)
Alah <i>et al.</i> (2020)	Qatar	Cross-sectional	37	Nurse at the crescent hospital	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	5.48(1.86 to 6.12) 2.35(0.718 to 7.70)
Buselli <i>et al.</i> (2020)	Italy	Cross-sectional	133	frontline nurse	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	0.19 (0.04 to 0.76) 0.10 (0.08 to 0.125)
Lai <i>et al.</i> (2020)	China	Cross-sectional	764	Graduate nurse, vanguard	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.57(1.22 to 2.02) 1.52(1.11 to 2.09)
Naser <i>et al.</i> (2020)	Yordania	Cross-sectional	151	Nurse age>18 years old, can speak Arabic	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.41(0.86 to 2.32) 1.00(0.66 to 1.52)
Pouralizadeh <i>et al.</i> (2020)	Iran	Cross-sectional	165	1st and 2nd line nurses	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.82(1.13 to 2.93) 1.49(0.92 to 2.40)
Prasad <i>et al.</i> (2020)	The USA	Cross-sectional	248	ENT nurse	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.81(0.87 to 3.78) 0.46(0.21 to 1.02)
Rossi <i>et al.</i> (2020)	Italy	Cross-sectional	472	Nurses in line 1 and 2	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.09(0.74 to 1.61) 1.36(0.95 to 1.96)
Ahin <i>et al.</i> (2020)	Turkey	Cross-sectional	254	1st and 2nd line nurses	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	6.0(4.0 to 9.0) 9.0(5.0 to 12.0)
Hong <i>et al.</i> (2018)	China	Cross-sectional	442	Front line nurse	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	1.258(1.014 to 1.561) 0.74(0.60 to 0.90)
Tu <i>et al.</i> (2020)	Cina	Cross-sectional	46	COVID-19 room nurse	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	8.07(2.92 to 2.33) 7.92(2.89 to 1.73)
AlAteeq <i>et al.</i> (2020)	Saudi Arabia	Cross-sectional	132	Nurse >30 years old	Serving COVID-19 Patients	Not serving COVID-19 patients	Anxiety Depression	0.45(0.05 to 0.84) 0.10(0.02 to 0.21)

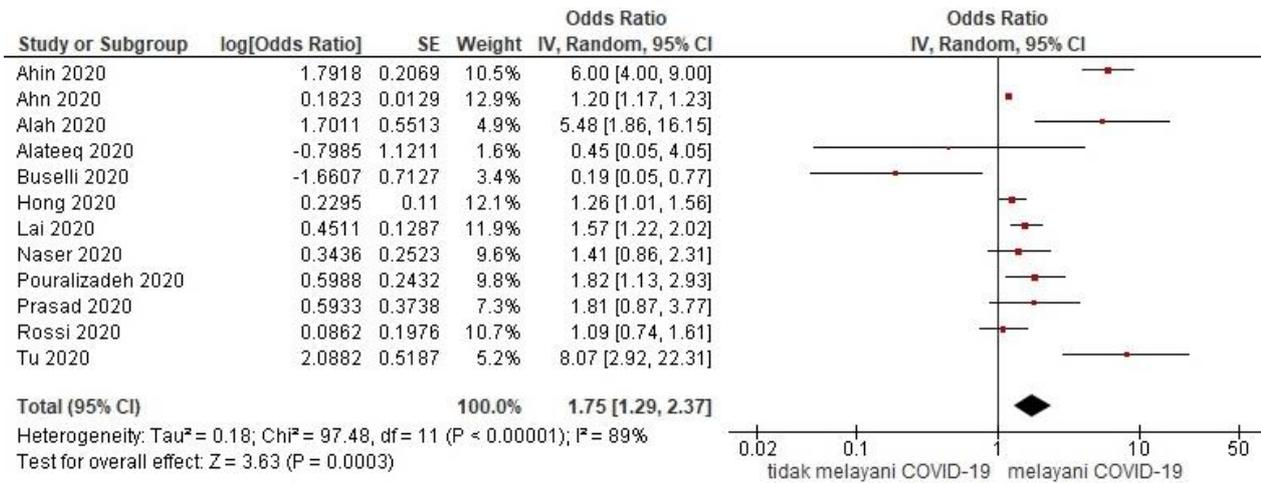


Figure 3. Forest Plot Effect of COVID-19 patient care to nurses' anxiety

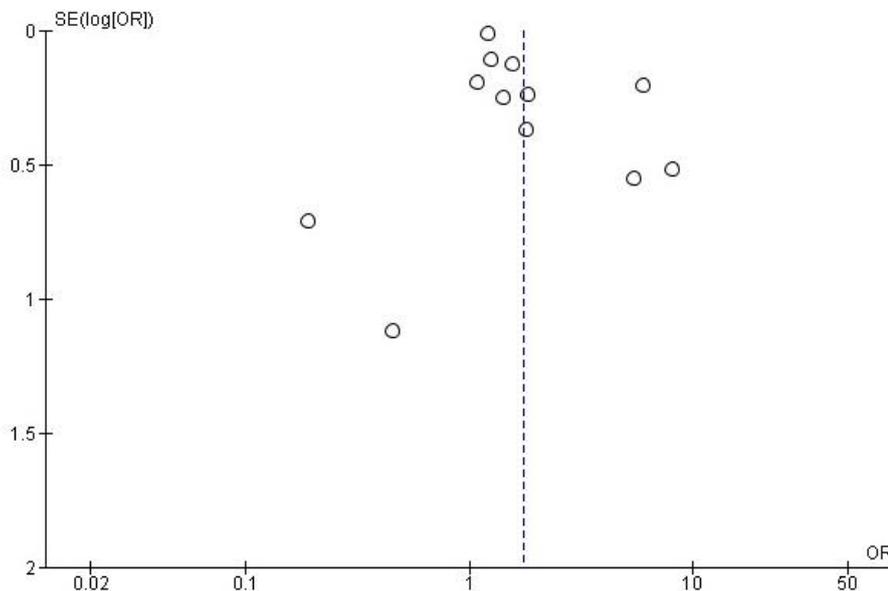


Figure 4. Funnel Plot Effect of COVID-19 patient care to nurses' anxiety

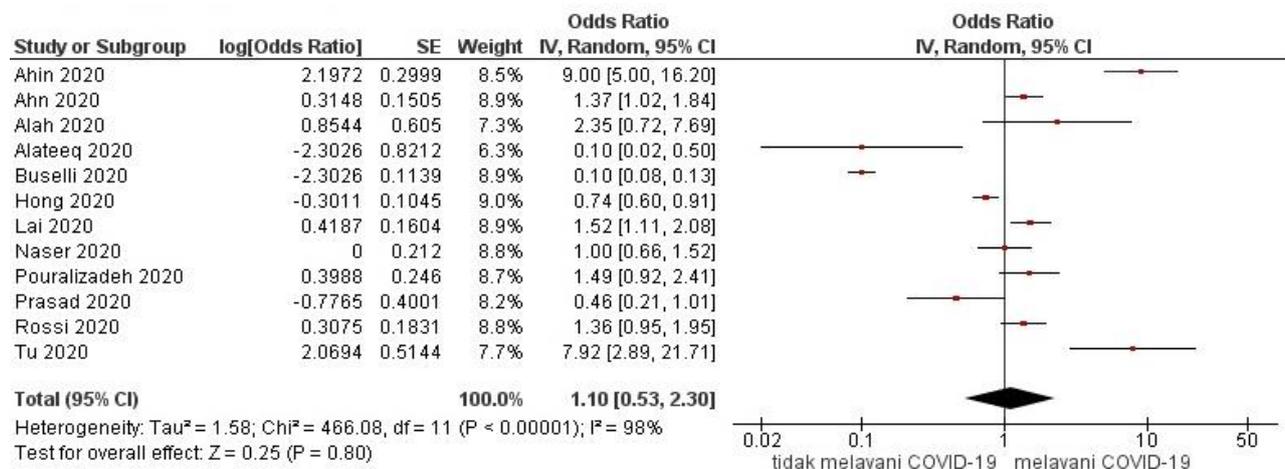


Figure 5. Forest Plot Effect of COVID-19 Patient care on nurses' depression

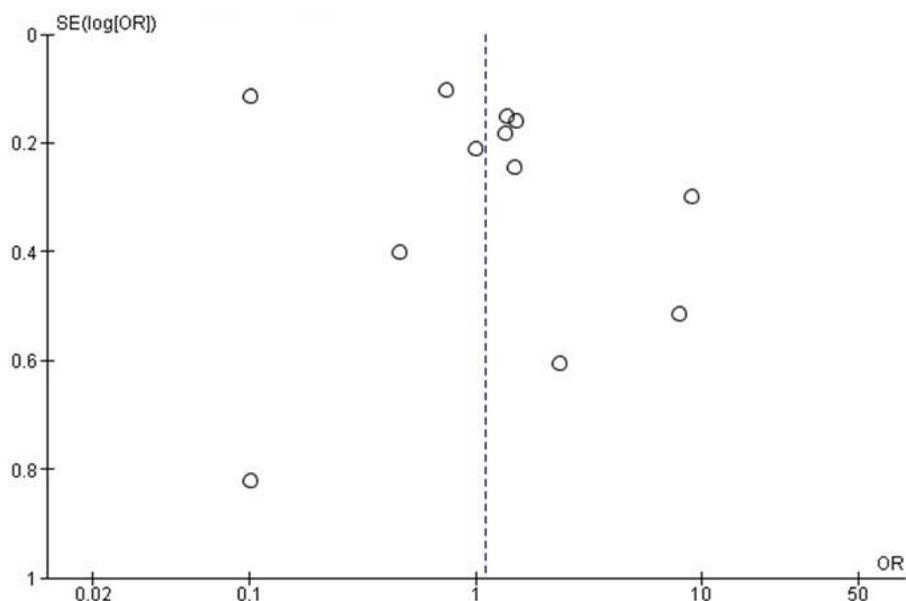


Figure 6. Funnel Plot Effect of COVID-19 patient care on nurse depression

DISCUSSION

This systematic study and meta-analysis examines the effect of COVID-19 patient care on levels of anxiety and depression in nurses in hospitals. This study discusses the psychological disorders experienced by nurses in serving COVID-19 patients.

This is in line with Pouralizadeh et al. (2020) who expressed anxiety that nurses working in the COVID-19 ward had a risk of 1.82 times compared to those who were not on duty in the COVID-19 ward (aOR= 1.82; 96% CI= 1.13 to 2.93; $p < 0.001$). Naser et al. (2020) revealed that during the pandemic individuals were under conditions of extreme stress which resulted in a high risk of developing anxiety and depression for healthcare professionals.

The results of this study are supported by Alah et al (2020) which states that nurses report more anxiety symptoms than other health workers (aOR = 4.90; 95% CI = 2.24 to 10.68; $p = 0.002$).

Several studies have stated that health workers who serve COVID-19 patients experience psychological disorders, according to researcher Alateeq et al (2020). There were

symptoms of depression nearly every day: feeling tired or having little energy (67.9%); little interest or pleasure in doing something (58.5%); difficulty falling or staying asleep or sleeping too much (57.9%); poor appetite or overeating (55.5%); sad, depressed, or hopeless (52.2%); difficulty concentrating on things, such as reading the newspaper or watching television (44.1%); moving or speaking very slowly, being so agitated or restless that they move more than usual (33.1%).

Health workers serving in Turkey during the COVID-19 pandemic experienced high rates of depression, anxiety, insomnia and symptoms of distress. In the research of Ahin et al (2020). The high incidence of mental health problems observed in this study indicates that health workers in Turkey need psychiatric support, nurses are generally reported to have a greater risk of psychological distress than doctors, in the study nurses experienced symptoms of depression (aOR = 9.0; 95% CI = 5.0 to 12.0; $p = 0.104$).

A similar study by Tu et al (2020), among 100 participants in the study, 46%

experienced depressive symptoms. Symptoms of sleep disturbances, depression, and anxiety are very common among frontline nurses caring for COVID-19 patients in Wuhan, China. Symptoms of anxiety and depression may be due to a lack of social support, stress at work, worries about COVID-19, and perceived negative feelings.

Research Hong et al (2020), of the 4,692 nurses who completed the survey 9.4% were considered to have symptoms of depression, regardless of different measurements, caused by the situation the nurse faced. As the epicenter of COVID-19, health workers in Wuhan are experiencing more panic, distress and a heavier workload.

Several studies have stated that the care of COVID-19 patients has an effect on increasing the risk of anxiety and depression in nurses in hospitals. The limitations of this study are that there is a language bias because it only uses English articles, publication bias shown in the funnel plot results in an asymmetrical anxiety table, and search bias because it only uses three databases.

AUTHOR CONTRIBUTION

Andang Sudarmono is the main researcher who selects topics, searches for and collects research data. Bhisma Murti and Hanung Prasetya analyzed data and reviewed research documents.

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This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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